

COMPARATIVE STUDY ABOUT THE FIRST CARE EFFICIENCY AFTER CHEMICAL BURNS ON 185 ACCIDENTS

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**Set up of a new
treatment protocol
in case of chemical accidents
in an industrial plant**

**Installation of Diphotérine®
In the Rhône Poulenc Factory
Vitry La Rochelle – France
Study and results about 197 accidents**

The following document deals with the presentation about the set up of a treatment protocol in case of chemical accidents in the Rhône Poulenc Factory from La Rochelle – France. This protocol was tested on 195 accidents since 1987. The year indicated, two major accidents occurred.

■ A young 27 years old man was splashed with warm concentrated nitric acid because of a pipe breaking. After a quick and prolonged rinsing with water, we could notice on the man several burn on the skull, the trunk and on the entire body.

**Ocular splash with
Warm concentrated nitric acid**
Rinsing with water during 15 mn
**Left eye : graft (rejected 6 months
later)**
Right eye : ocular hypertension

The cornea of the left eye presented a white aspect and the right eye was hyperaemic. This man was driven to the hospital. Several weeks later a corneal leucoma persisted on the left eye and the eyesight was nil. A stoppage of the lachrymal canal was noticed on the right side with an hypertension of the ocular globe and an $2/10^{\text{th}}$ eyesight. Several months later a corneal graft is tried on the left eye but is rejected 6 months later. We notice on the right eye an hypertension of the ocular globe and a constant eyesight, still equal to $2/10^{\text{th}}$.

**Cutaneous splash with
Concentrated caustic soda**
Rinsing with water during 15 mn
Cutaneous graft on the right buttock
Good cicatrization

■ The second accident concerns a 43 years old man splashed on the back and the right buttock with concentrated caustic soda. Here also, a quick and prolonged rinsing with water was done, unfortunately, 48 hours after the accident, an important necrosis was noticed on the right buttock entailing a graft.

**Cutaneous burns
Rinsing with water**

**Ocular burns
Rinsing with water**

On the 41 accidents due to cutaneous chemical burn on the plant, 4 accidents entailed a loss of work superior or equal to 8 days that is to say 10% of the days lost from work, 18 accidents entailed medical care with the handling over of a care notebook for less than 15 days; and for 19 accidents there were no secondary care necessary after the care given at the infirmary.

Aim :
**To decrease the number of accidents
and their consequences**

**1. Thanks to the prevention
Reinforcement of PPE**
**2. Care improvement
Diphotérine® - The alternative to the
rinsing with water**

Front to this conclusion, two actions were conducted in parallel. The aim is to reduce the number of accidents and their consequences.

Both actions consisted in one part in an intensive prevention campaign, about the importance to wear individual protections. The act of wearing safety glasses became a permanent obligation as for the act of wearing gloves and anti acid clothes. There was also a sensitisation to the risks in case of manipulation of chemical products for the operators.

In the same time a comparative study between water and Diphotérine® was decided. A test work shop was chosen for a period of one year. This work shop was equipped with Diphotérine® rinsing, fix eyewashes and autonomous portable showers.

**1989
First trials with Diphotérine®
Set up of a new protocol**

**1- One test work shop in fabrication
Eyewash
DAP**

2. To seek medical advice systematically

Nevertheless all rinsing station with water were maintained. Diphotérine® and its action mechanism are presented and explained to the concerned partners. The H&S centre, the first aiders then the operators from the concerned workshops as the ophthalmologist from the city and the Hospital Center from La Rochelle

were also invited to an information meeting about Diphotérine®.

A systematic follow up protocol is defined : after each chemical splash in the eye, no matter the rinsing solution used, that is to say water or Diphotérine®, a medical advice must be proceeded. For the skin, each chemical burn, no matter its seriousness will be systematically followed at the Infirmary on day 1, 2, 3 and 8.

Results after this year :

Plain decrease of the accidents, from 41 accidents due to cutaneous burn in 1987 to 18 accidents in 1989 and from 28 accidents on the eyes to 11 accidents in 1989.

The reduction is essentially due to the act of wearing individual protections. For the results comparing water and Diphotérine®, there were 18 accidents due to cutaneous splashes. On these 18 accidents, 8 were rinsed with water and 10 with Diphotérine®.

Results for 1989

Rinsing with water **skin** **eye**

Rinsing with Diphotérine® **skin** **eye**

On 8 accidents rinsed with water, 3 did not require any secondary care that is to say 37.5% of the accidents. 4 accidents required simple care at the infirmary in the form of dressings. And for 1 accident a care note book for the

Medical follow up was necessary, that is to say 12.5% of the accidents.

For the ten splashes rinsed with Diphotérine® in 9 cases, that is to say 90% of the accidents, there were no secondary care, and in one case a simple care was proceeded at the infirmary.

For the eyes, on the 11 ocular splashes occurred in 1989, 4 were rinsed with water and 7 with Diphotérine®. For the 4 cases rinsed with water, 2 required simple care at the infirmary and 2 required medical care with the delivery of a care note book. As regards to the rinsings with Diphotérine® on 7 splashes, no secondary care were necessary for 6 accidents that is to say 71.4% of the accidents and 1 required simple care at the infirmary, that is to say 28.6%.

Since 1990

**Generalisation of Diphotérine®
while maintaining water**

For risky interventions :

Portable sprays

Portable individual eyewashes

Permanent equipment :

At least 1 DAP in each workshop

At least 1 eyewash at each stage

In the same time, Pursuit of the sensitisation

- **first aiders : training, recycling**
- **information during for arrival at a new job**
- **permanent billsticking of
instructions in the work shops**

Since the end of 1989, Diphotérine® was generalised on the entire plant. Each workshop was equipped with eyewash and autonomous portable shower. For each risky intervention, the operators are equipped with portable sprays and portable eyewash that they carry in the pocket or on the belt. In the same time the sensitisation of the first aiders was intensified on the use of Diphotérine®. This sensitisation was also proceeded with new employees, temporary workers, trainees, each operator who changes of work shop and also with external companies that interfere on the site in risky areas.

Reminding to everybody the absolute necessity to go to the infirmary after each chemical splash was done. The rinsing areas with water were maintained. The instruction is when the first rinsing is proceeded with Diphotérine® it must be pursuit with Diphotérine®. In opposition, if the operator does not have Diphotérine® at disposal, and if the nearest rinsing area contains water, he must use water and continue the rinsing with water.

		1989		
	Skin	Skin	Eyes	Eyes
	Rinsing with water 15 mn	Rinsing with Diphoterine®	Rinsing with water 15 mn	Rinsing with Diphoterine®
No care				
Simple care at infirmary				
Medical Care				

		1990		
	Skin	Skin	Eyes	Eyes
	Rinsing with water 15 mn	Rinsing with Diphoterine®	Rinsing with water 15 mn	Rinsing with Diphoterine®
No care				
Simple care at infirmary				
Medical Care				

Between 1989 and 1996, a significant difference of the accidents seriousness after the rinsing with Diphotérine® was noted. In 1987, around 5% of losses of work and 25% of medical care. In 1989,

Results synthesis Comparison water / Diphotérine®	
•	Loss of work
•	secondary care

<u>Conclusion</u>	
-	The LOW : more than 7% in 89 0% in 1996
-	The accidents entailing secondary care : More than 25% in 89 3.3% in 1996

we notice an increase of medical care due the institutionalisation of the systematic specialised medical advice for each chemical aggression in the eyes, that increases medical care. Since 1989, there is no more loss of work and we note a very important decrease of medical care.

How to use Diphotérine®	
To obtain an optimum result, it is necessary to :	
-	to act quickly
-	to proceed to a prolonged rinsing = use the entire content for each rinsing
-	Splash with hydrofluoric acid = use Hexafluorine®

Emergency instructions	
Undress – Rinse with Diphotérine®	
Always use the complete content	
Never delay a rinsing	
Obligatory visit to the infirmary	

The advice to use Diphotérine® are to act quickly, in less than 3 minutes, to use the complete content, and even if there is a pain relief, to undress and to rinse with Diphotérine® before going systematically to the infirmary.